Population Biology

Fisheries Economics

Does the MBNMS need more MPAs to protect the ecosystem?

Does the MBNMS need more ecosystem protection from fisheries in federal waters?

If so
what type of protection will be the most effective?

Needs Questions

1. Was ecosystem function in federal waters threatened by past federal management?
2. What are the existing protections?
3. How successful are existing protections?
4. Is ecosystem function in federal waters threatened by current federal management?
5. If threatened: what type of regulations will be the most beneficial?

1. Was ecosystem function in federal waters threatened by past federal management?

Stock assessments clearly show that a number of groundfish species were overfished.

WHY?

1. Fisheries biologists used the same concept used by advocates of MPAs.

   Assumed high density-dependence with quick population doubling time at low biomass.

Tropical reef fishes	- double	2-3 yrs	40%
Productive CC groundfish	- double	7-10 yrs	10%
Many CC groundfish	- double	15-25 yrs	3%

2. What are the existing protections?

Traditional State of California Resource Management (2006)

Report describes most of the California gear, area, season, size, sex, and bag limit regulations. Summarizes them by habitat type.

--- Very complicated, overlapping series of regulations that provide considerable ecosystem and fishery protection.

NOT ENOUGH PROTECTION OR NEAR TOTAL PROTECTION

1. Important species in hard-bottom nearshore, shelf and deeper habitats are not adequately protected by California regulations.

2. In contrast, the total effect of traditional regulations make it impossible to economically harvest all but a few species living on soft-bottom nearshore, shelf and shelf break habitats.

3. Provide considerable ecosystem protection
(rockfish gillnet restrictions : protect birds and mammals)

2. What are the existing protections?

Pacific Fisheries Management Council

Federal regulations based on fishery management plans (FMPs)

Direct Control of Catch (DCC) - Optimum Yield - annual quota

Traditional gear limitations - ecosystem protections

Essential Fish Habitat areas (MPAs) - ecosystem protections

Temporary MPAs - Rockfish Conservation Areas - weak stock mgt

Sablefish Management

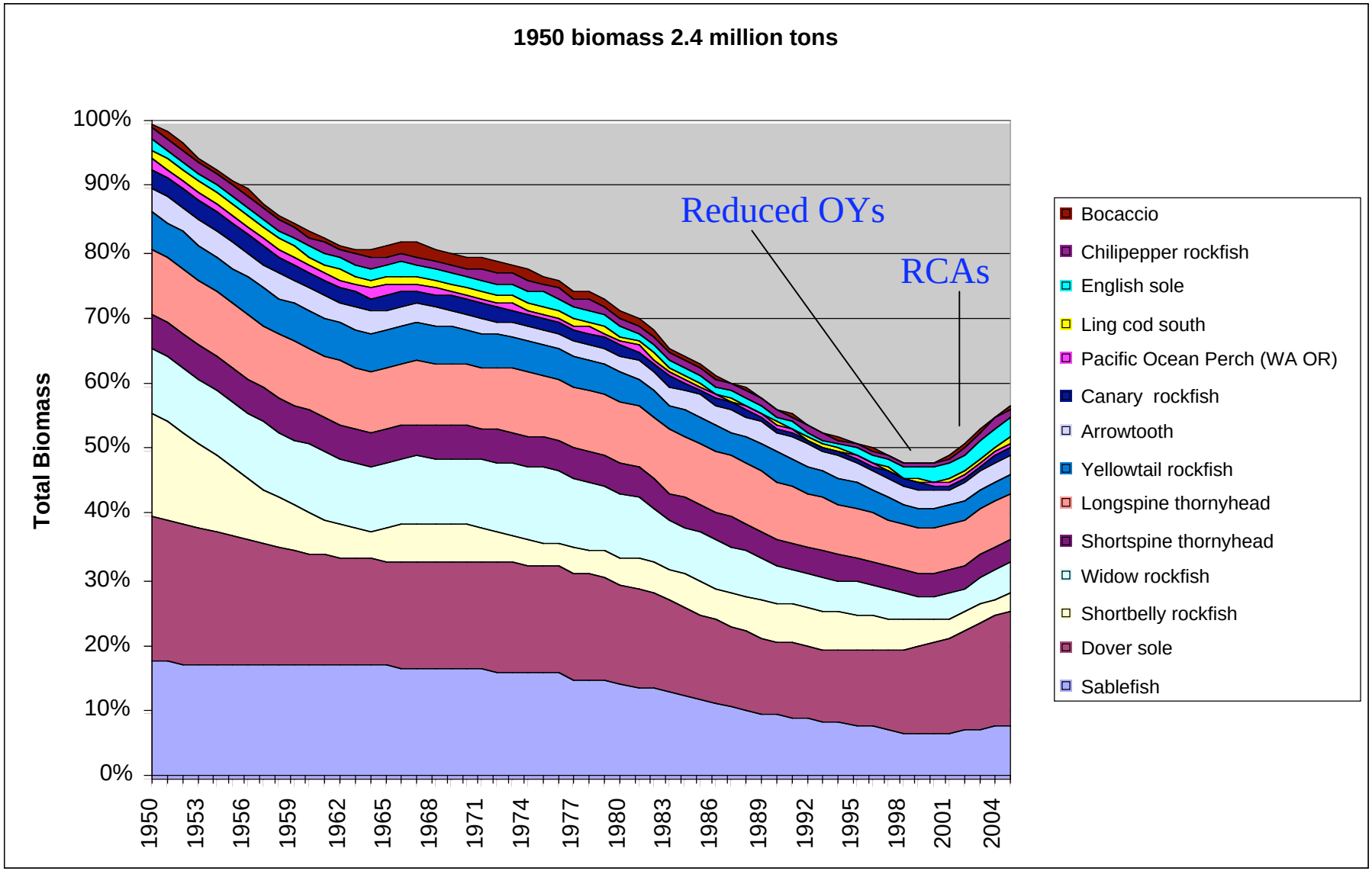
1. Stock assessment team - model current biomass
2. Control rule establishes ABC
3. Peer review team, SSC, FMP advisory team.
4. Council sets OY: ecosystem, social, economic
5. OY is allocated between regions and gear types.

Limited entry trawl:	7 tons/2 months
Limited entry fixed gear:	2.5 tons/2 months
Open access fixed gear:	1.05 tons/2 months

6. In season adjustment.

3. How successful are existing protections?

Trends in the abundance of groundfish stocks off the west coast



3. How successful are existing protections?

Local landings by port (tons)

	1996	2006	change
Princeton/Halfmoon Bay	2,656	1,398	-47%
Santa Cruz	896	147	-84%
Moss Landing	12,493	29,646	+137%
Monterey	12,383	179	-99%
Morro Bay	2,675	434	-84%

2.18

Value by port ($ millions)

6.03

	1996	2006	decline
Princeton/Halfmoon Bay	$ 6.35	$ 4.79	-25%
Santa Cruz		.62	-71%
Moss Landing	10.23	4.88	-52%
Monterey		.87	-86%
Morro Bay	6.47	1.91	-71%
Total	31,27	13.06	-58%

Landings in MBNMS

		%	2006 Tons	%	change
TOTAL	25,774		29,969		+16%
Total pelagic species	20,482	79.5%	28,812	96.1%	+41%
Total slope species	3,228	12.5%	806	2.7%	-75%
Total everything else	2,068	8.0%	372	1.2%	-82%
non pelagics	5,296		1,178		-78%

Landings of pelagics (tons)

COASTAL PELAGICS	tons	%	2006	%	change
Sardine	8,805	34.2%	19,523	65.1%	+122%
Anchovy	3,917	15.2%	8,416	28.1%	+115%
Squid	5,150	20.0%	561	1.9%	-89%
Mackerel unspec.	877 1	3.4%	189		
Herring	274	1.1%	41	-92%	-85%

-78%

HIGHLY MIGRATORY PELAGICS	tons				
Albacore	238		22		-91%
Swordfish	221 4		19		
Opah	20				-95%
Thresher shark	15		<1		-99%
Bluefin tuna	13		<1		-99%
				-96%	
Chinook salmon	937	3.6%	37	-69%	
Other	14				

Pelagics 96% landings in MBNMS

Generally accepted that Pelagics are not protected by MPAs

Conference at Aquarium established little contact between pelagic and benthic habitats at depths beyond 50 m. (27 fathoms)

State MLPA process used this to avoid placing no take areas in offshore habitats where they would be counter productive

No take MPAs still being proposed for offshore habitats

Slope species - 2.7% 2006 landings

			2006	change
TOTAL	994 tons 849 773	3,228 tons	806 tons	-75%
Grenadier			46 tons	-95%
Dover sole			214	-75%
Sablefish		420	273	-65%
Thornyheads (2 sp.)			126	-70%
Splitnose Rockfish		160	96	-40%
Blackgill Rockfish		28	17	-39%
Bank Rock fish		4	22	+573%

Everything else - 1.2% 2006 landings

		2006	change
Bocaccio (biomass)	174	6% 211%	+67%
Bocaccio (local catch)	124	126 tons	-98%
	674 tons		
Chilipepper Rf.		11 tons	-98%
Widow Rf.		4	-98%
		4	
Sanddab			-93%
English sole	109	9	-92%
Rex sole	107	12	-89%
Lingcod	84 31	6	-92%
California halibut	56 83	35	-37%
		94	
Petrale sole	123		-33%
Spot Prawn	35		-11%
Dungeness crab	17		+392%
All other species	437	67	-75%
TOTAL	2,068 tons	372 tons	-82%

Why did the landings of non-pelagics and highly migratory species decline so markedly over the last decade?

Greatly reduced federal catch limits for groundfish

Rockfish Conservation Area (2003)

Area-based drift gillnet restrictions for leatherback turtles (2001)

State Nearshore Species Management Plan

Reduction in the number of commercial fishers:

(20,363 California comm. fishers in 1980 : 3,835 in 2007)
Limited entry, trawler buy-outs, loss of shore facilities, economics

Regulations enacted since 2006

State MLPA Reserves and Conservation MPAs

Federal Essential Fish Habitat MPA Network

State 3-mile trawl closure extended to 12 miles in the center of Monterey Bay - MPA under federal definition

No trawling allowed deeper than 700 fathoms.

Federal Essential Fish Habitat MPAs

Established June 12, 2006

3 EFH areas in study area

Total 4,090 sq mi

1,435 in study area

DSM 775 sq mi

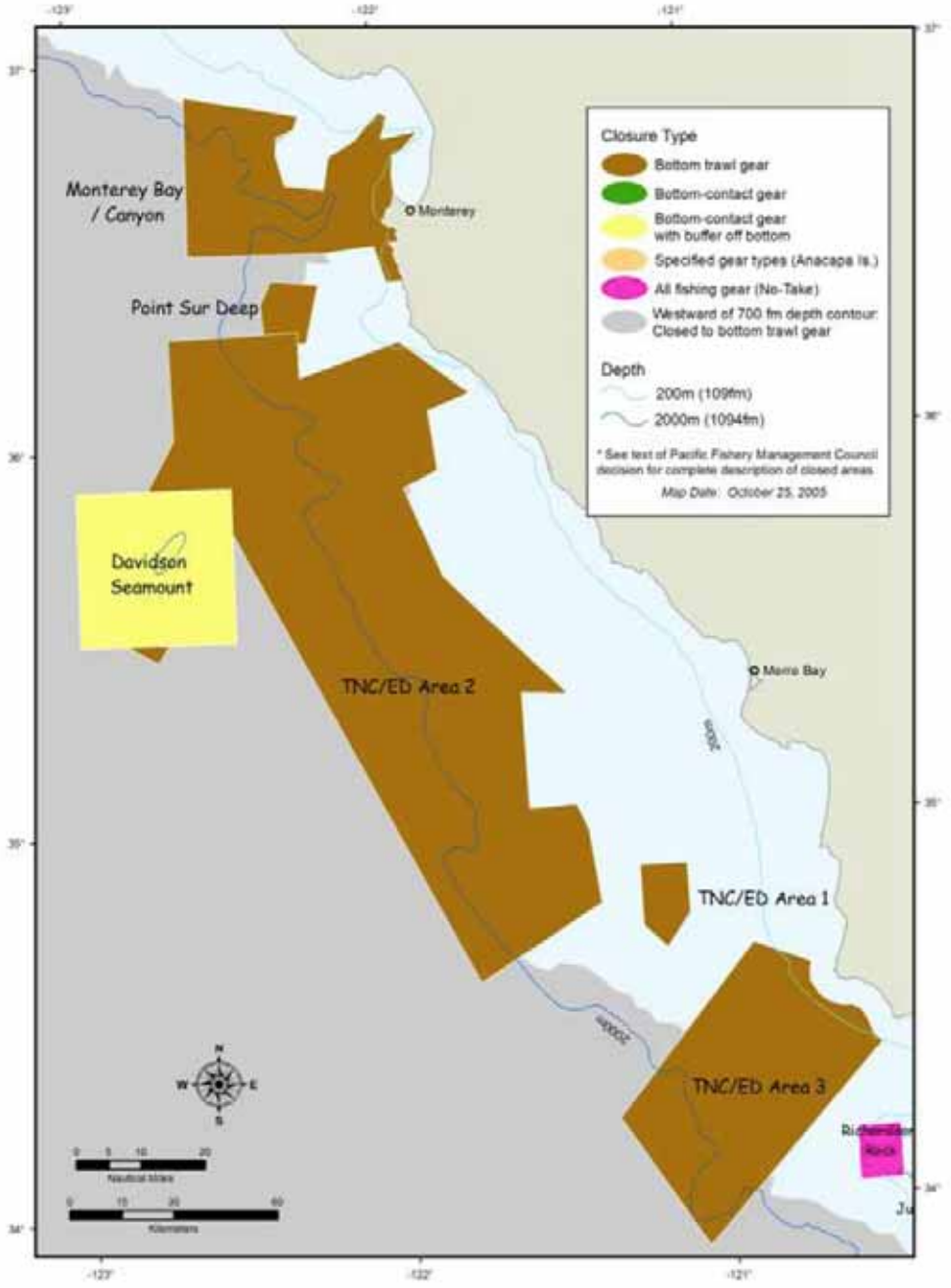
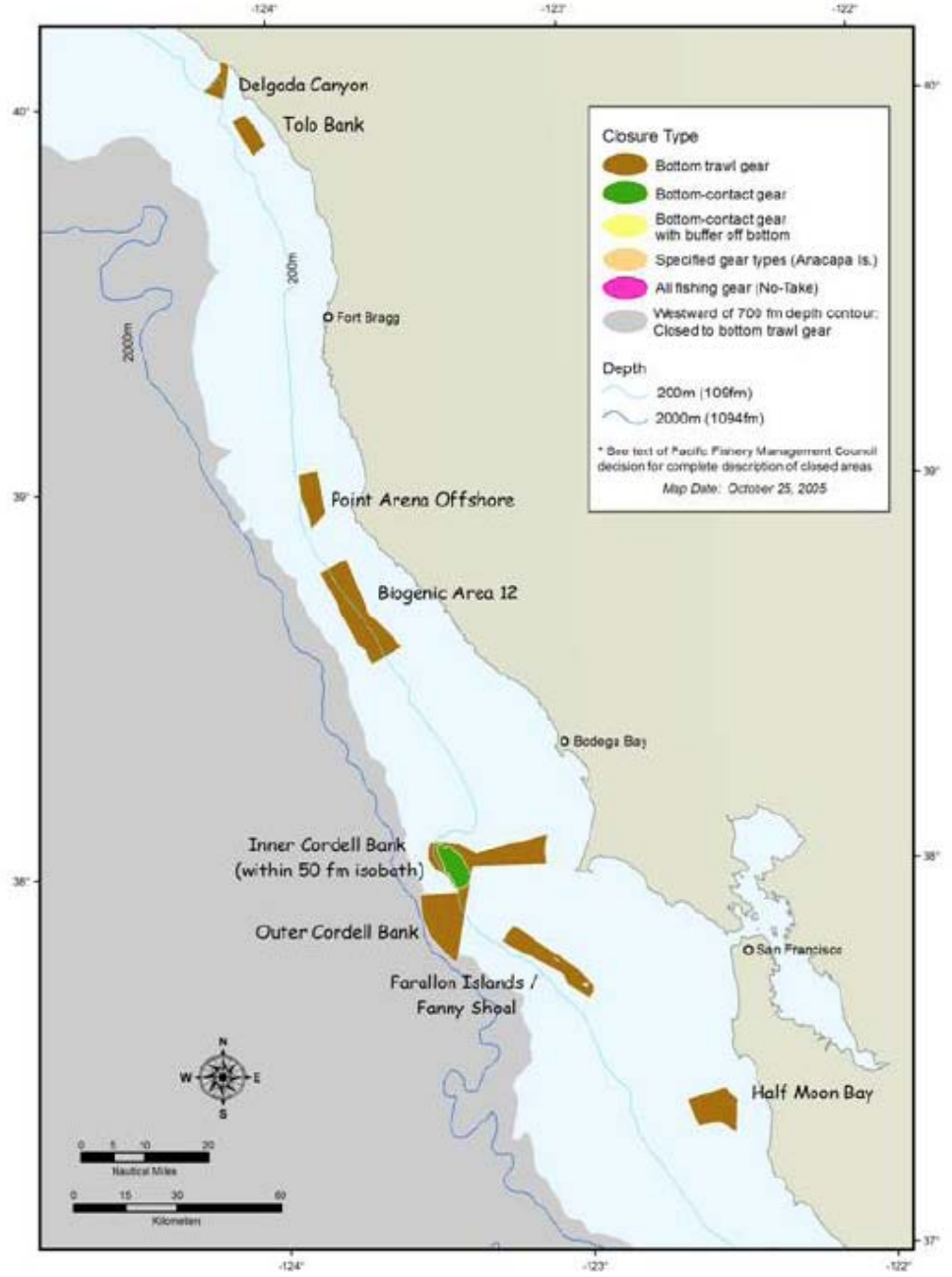


Figure 2-36: Areas Identified as Ecologically Important Areas Under the Council Preferred Alternative –Central California. (new since DEIS)

Federal Essential Fish Habitat MPAs



igure 2-35: Areas Identified as Ecologically Important Areas Under the Council Preferred lternative –Northern California. (new since DEIS)

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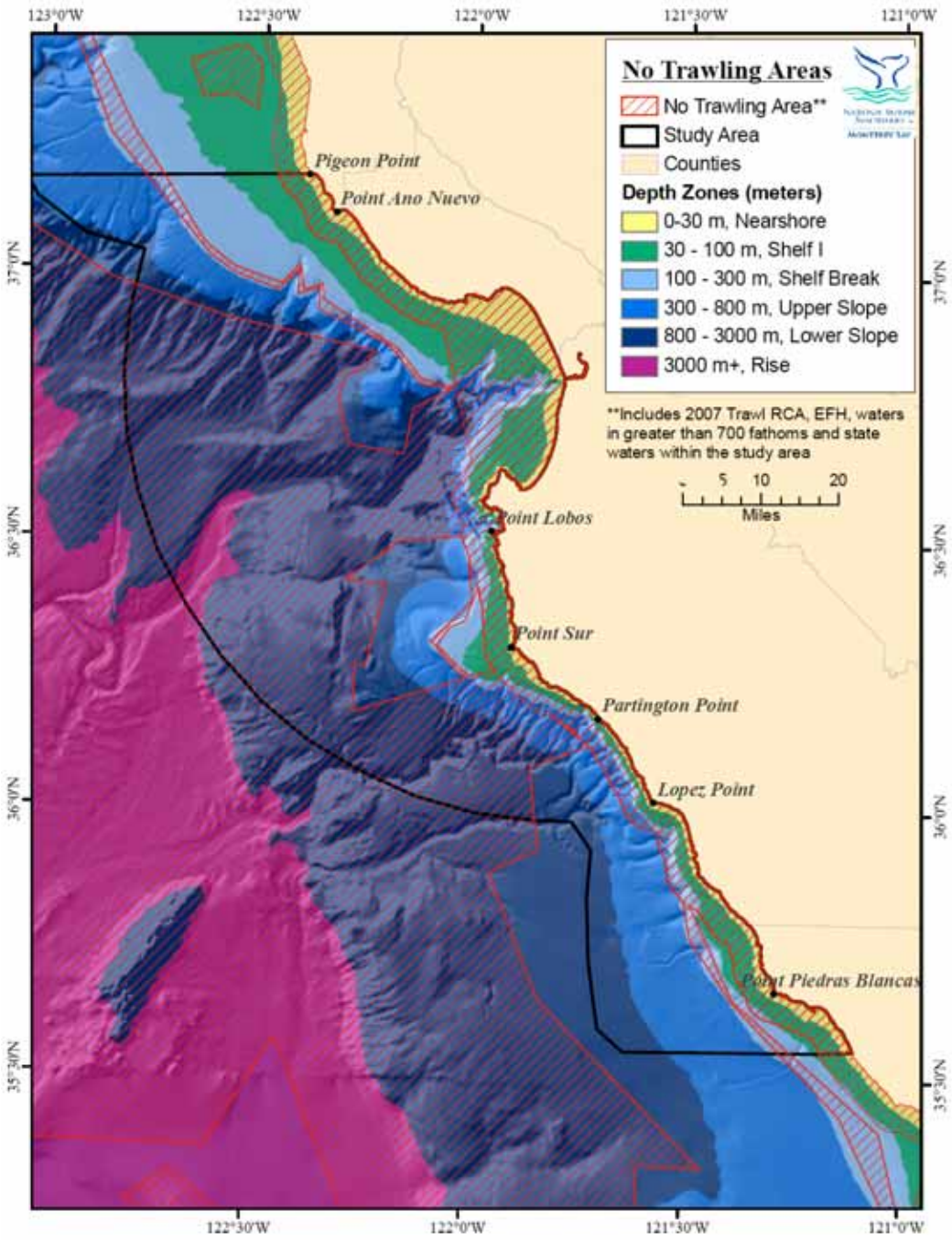
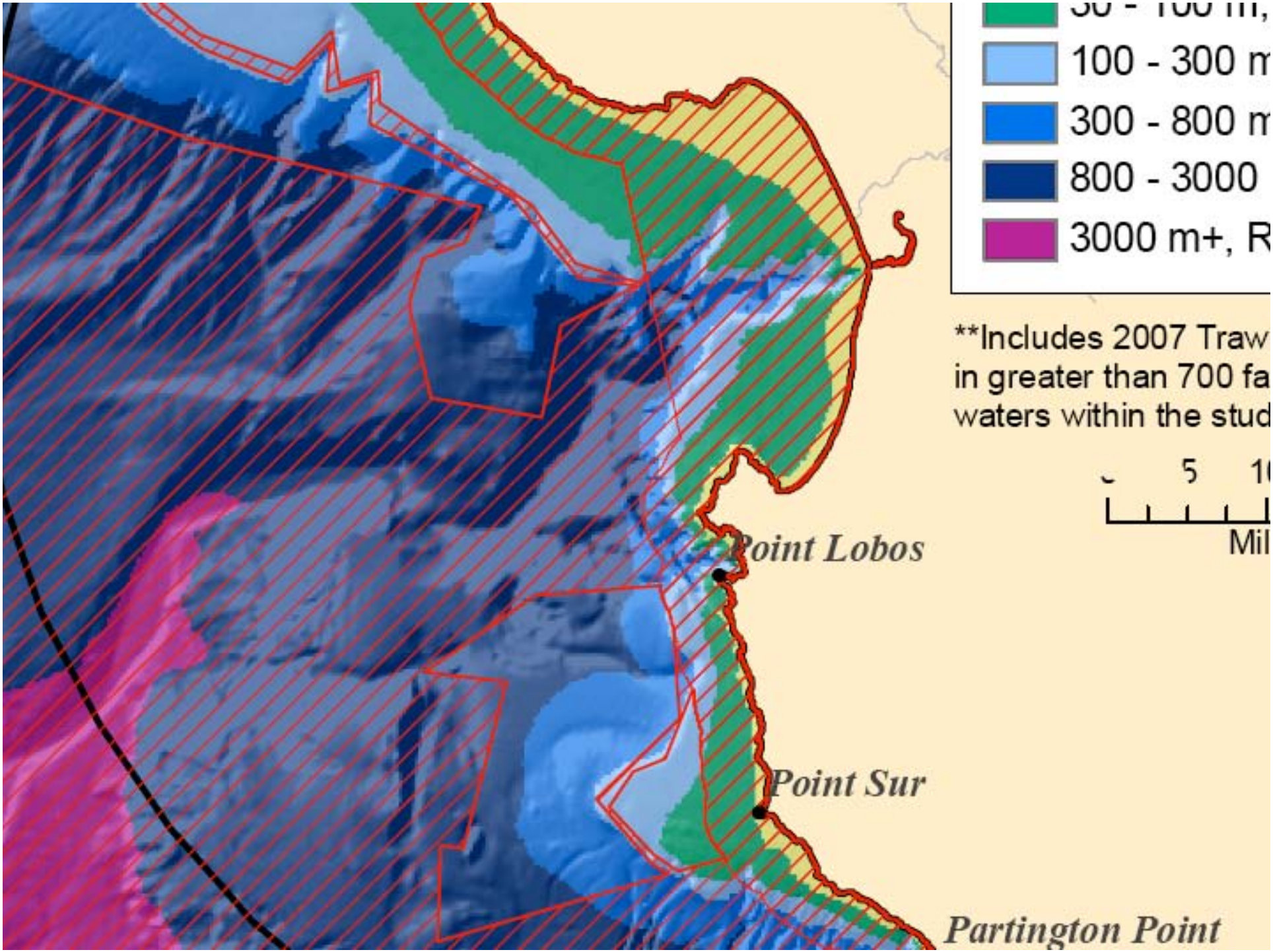
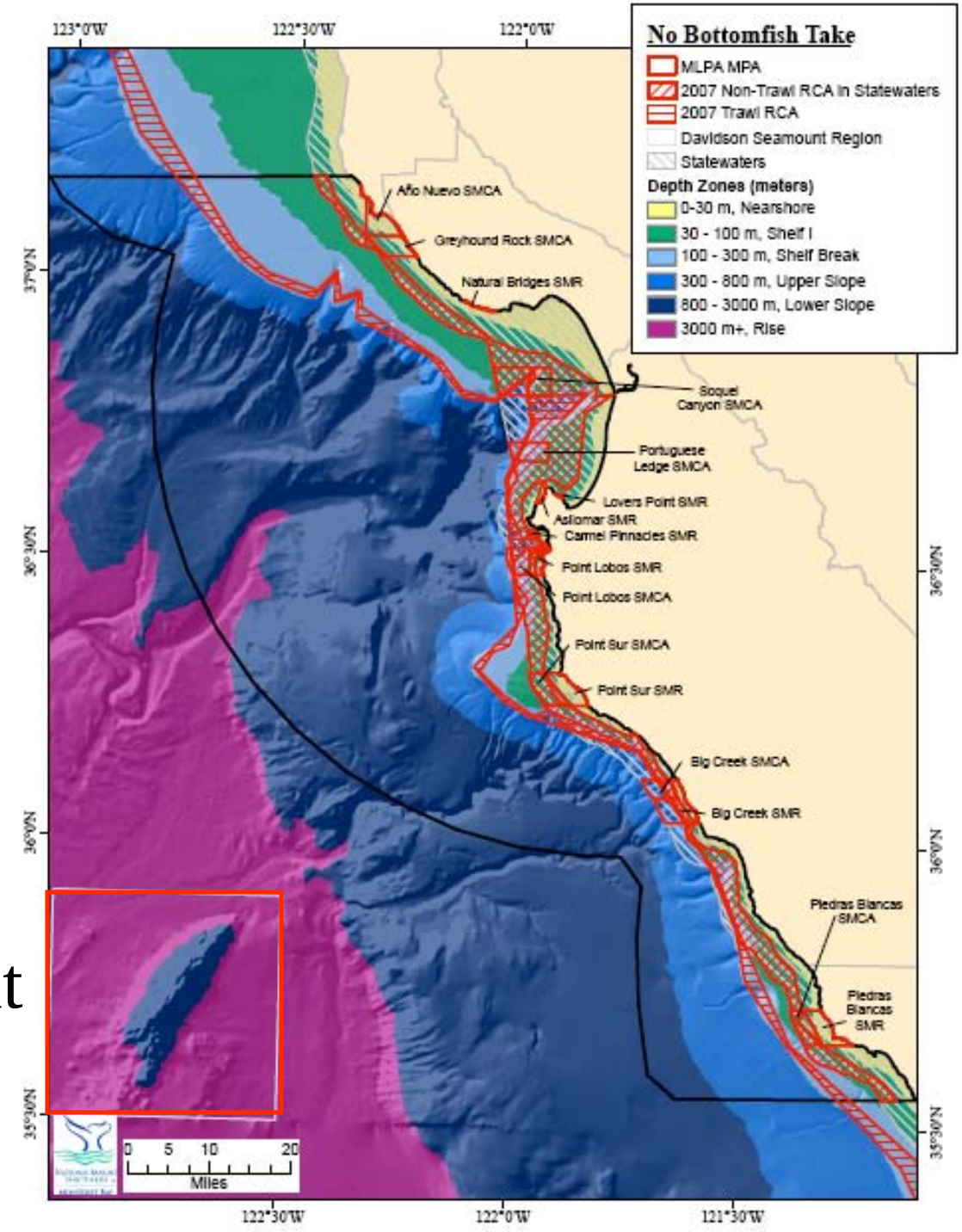
MPAs with no trawling

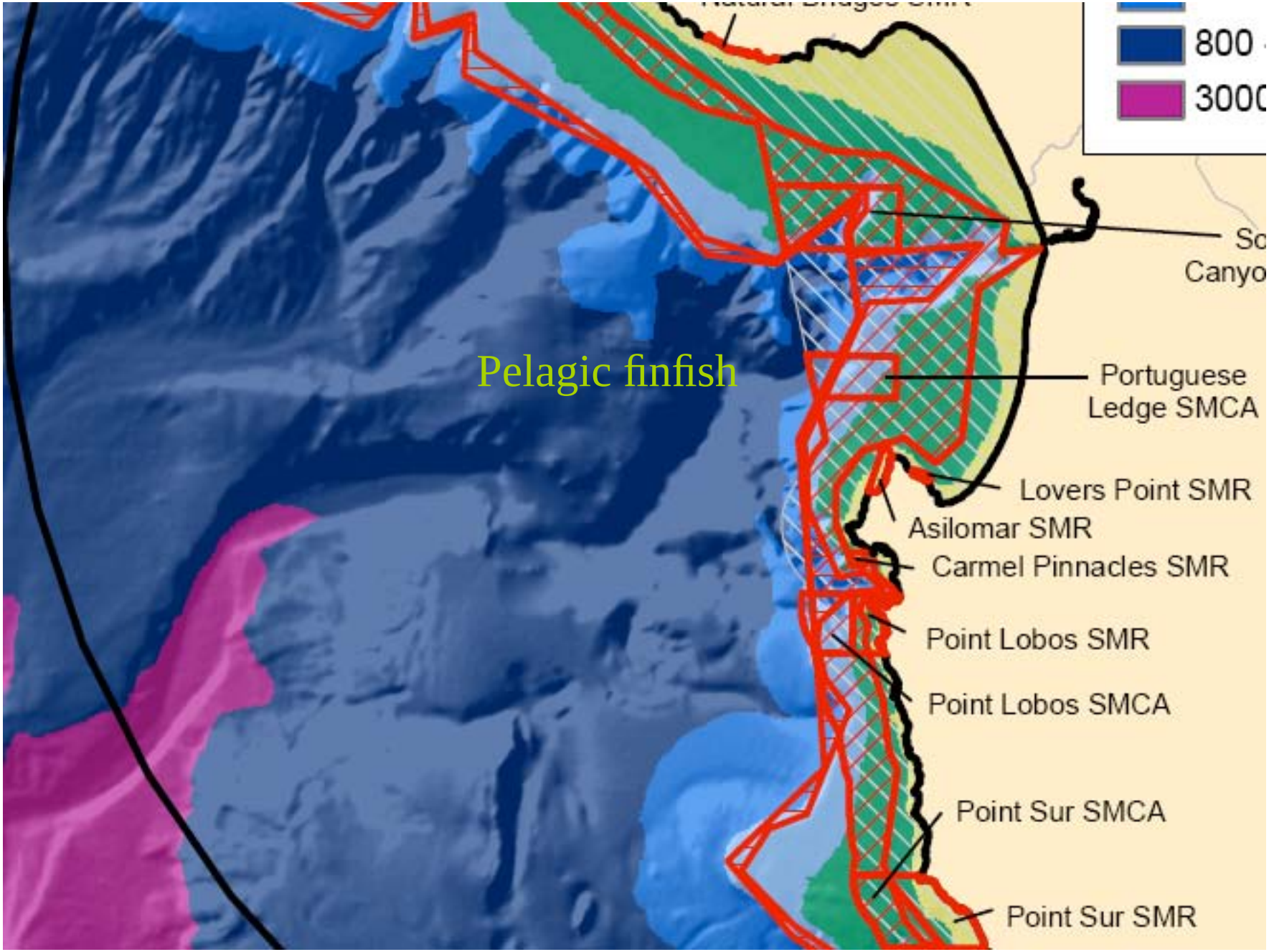



100 - 300 m
300 - 800 m
800 - 3000
3000 m+, R
**Includes 2007 Traw
in greater than 700 fa
waters within the stud
5
Point Lobos
Point Sur
Partington Point

MPAs with no take of bottomfishes

Davidson Sea Mount



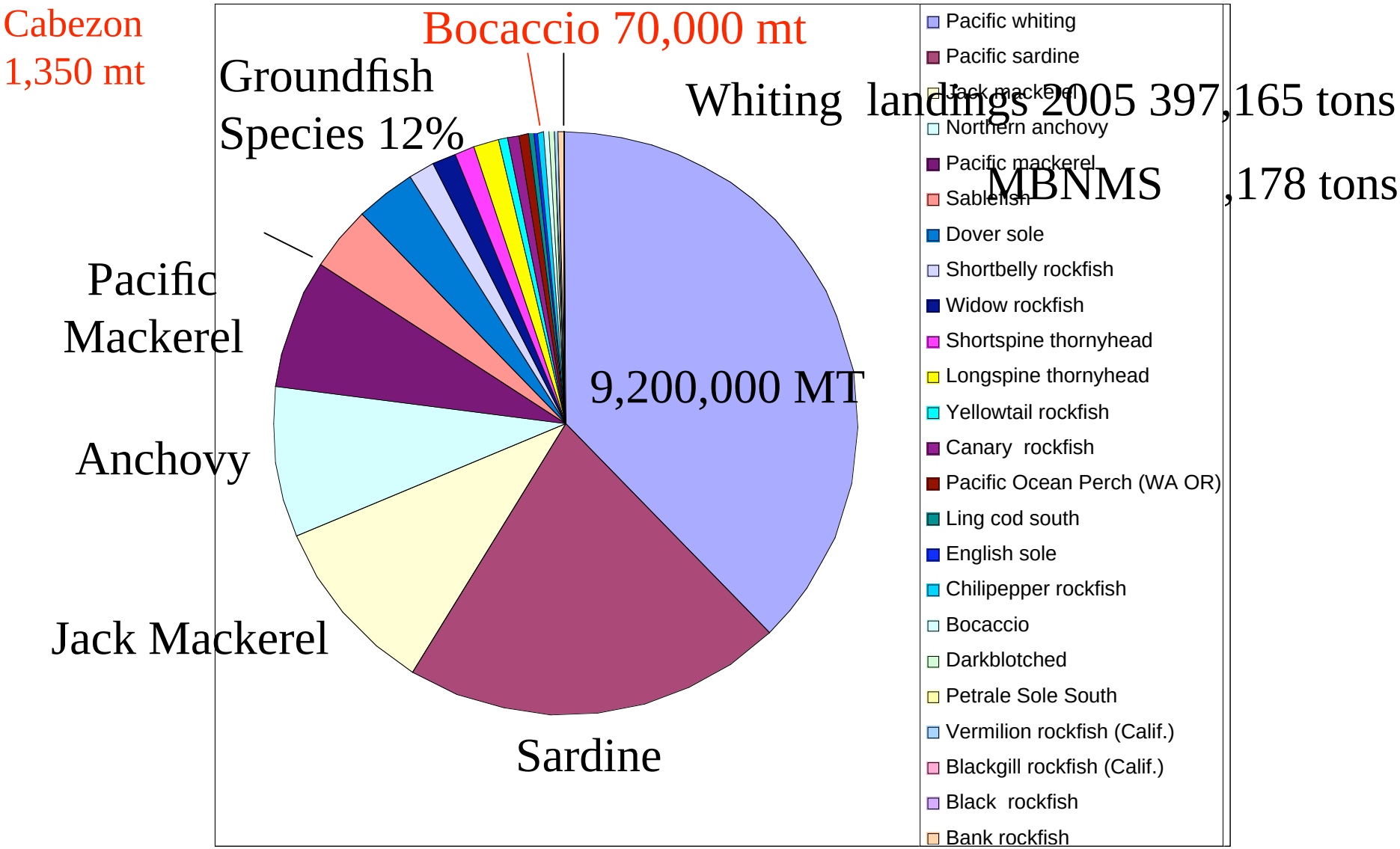

800
3000
Pelagic finfish
Portuguese
Ledge SMCA
Lovers Point SMR
Asilomar SMR
Carmel Pinnacles SMR
Point Lobos SMR
Point Lobos SMCA
Point Sur SMCA
Point Sur SMR

Area and percentage of area by habitat type for no trawling and no take of bottomfish MPAs.

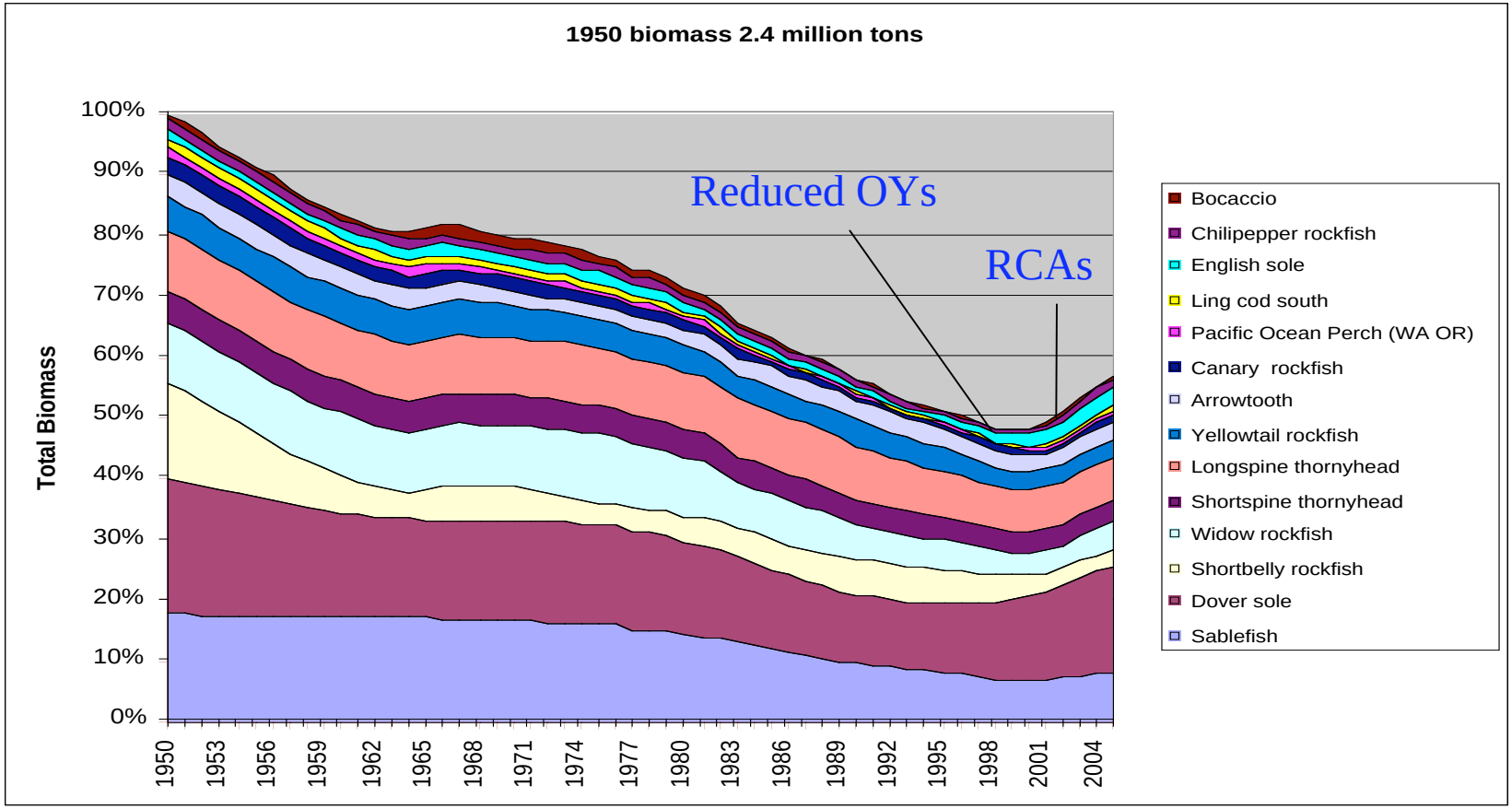
(data provided by Sophie De Beukelae MBNMS)

	Depth Range		MBNMS Study Area	MPAs with No Trawling			MPAs with No Bottomfish Take		
	meters	fathoms	sq. mi.	sq. mi.	RCA	-RCA	sq. mi.	RCA	-RCA
MBNMS									
Nearshore	0-30	0-16	164.7	163.6	99%	99%	28.18	18%	17%
Shelf	30-100	16-55	542.4	398.8	74%	73%	65.32	48%	12%
Shelf break	100-300	55-164	399.6	148.8	37%	23%	90.00	36%	5%
Upper slope	300-800	164-437	897.4	193.8	22%	20%	62.80	7%	2%
Lower slope	800-3000	437-1640	2141.2	1729.2	81%	81%	1.21	0%	0%
Rise	3000+	1640+	70.3	70.3	100%	100%	0.00	0%	0%
TOTAL			4215.7	2704.4	64%	62%	247.51	12%	3%
Davidson Seamount									
Lower slope	800-3000	437-1640	113.5	113.5		100%	113.5		100%
Rise	3000+	1640+	662.0	662.0		100%	662.0		100%
TOTAL			775.5	775.5		100%	775.5		100%

Ecosystem Protection - unfished stock sizes for major pelagic and groundfish species in the California Current ecosystem.



4. Is ecosystem function in federal waters threatened by current federal management?



If the Sanctuary has information that the ecosystem is threatened. They should go to the Council with their analyses and see that the entire ecosystem is protected. Not just the MBNMS?

5. If ecosystem function is threatened what type of regulations will be the most beneficial

Two competing strategies for ecosystem protection MPAs vs DCC

MPAs work where they decrease the catch.
Overfished territorial species (tropical reef species)

MPAs will have little population effect in areas with highly regulated DCC - WHY

Quick reason - in season adjustment of catch limits

Generic groundfish: stays in MPAs, only trawl

Limited entry trawl permit - 7 tons/ 2 months

2006 with DCC 3 hrs/ton : 21 hrs - 7 tons

2008 DCC+50% MPAs 3 hrs/ton : 21 hrs - 7 tons

2013 DCC+50% MPAs 4 hrs/ton : 28 hrs - 7 tons

2018 DCC+50% MPAs 5 hrs/ton : 25 hrs - 5 tons

2008 with DCC 5 tons 3 hrs/ton : 15 hrs - 5 tons

2013 with DCC 2.5 hrs/ton : 12.5 hrs 2.8 hrs/ton : 14 hrs - 5 tons

2018 with DCC - 5 tons

Ecosystem Management

Major Problem:

Un-coordinated management by 4 different agencies

with 4 different philosophies

California State Legislature

California Fish and Game Commission

Pacific Fisheries Management Council

National Marine Sanctuaries